

Obstetrics & Gynecology TEAM



Rh isoimmunisation, ABO INCOMPATIBILITY

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◆ very important ◆ mentioned by doctor ◆ team notes ◆ not important

Rh ISOIMMUNIZATION

Is an immunological disorder occurs in pregnant a Rh-ve mother carrying Rh+ve fetus

It affects 1 in 250 live births in Europe and North America, it is much less frequent in other parts of the world such as Asia, where the Rh-negative blood group is uncommon.

-Pathophysiology:

The Rh antigen is limited to the red cell surface (Rh complex, C,D,E,c,e)

-fetomaternal HAEMORRHAGE (fmH):

Rh isoimmunization can only take place if fetal red cells cross the placental barrier into the maternal circulation.

The placenta is subjected to maximal trauma during delivery

After abortion with a gestational age **above 14 weeks**

APH / trauma

External version

Amniocentesis

Complicated and difficult deliveries

Caesarean section

-THE NATURAL HISTORY OF Rh Isoimmunization:

Rhesus antibodies are **humoral antibodies or free antibody**

IgM – large, unable to cross the placenta

IgG – small, able to cross the placenta and

Attach itself to Rh positive red cells

leading to haemolytic anaemia

-IMMUNE RESPONSES ARE:

A- Primary – first response to an antigen appears after several weeks and is IgM.

B- Secondary When exposed for the 2nd time a primed, antibody will appear within a few days and is IgG.

Generally, the quantity of antigen required to produce a secondary immune response is very much smaller than that required to initiate the primary immune response.

-Pathophysiology:

The first pregnancy is usually unaffected by RHD because FMH's of sufficient magnitude to induce primary immunization do not usually take place until delivery.

Only about 5% of all Rh-negative mothers form antibodies.

Vast majority of FMH's after delivery are small but about 0.2% of mothers have larger bleeds of 30 ml or more. **The risk of Rh immunization is proportional to the size of the FMH.**

ABO INCOMPATIBILITY

When the mother and the baby are ABO incompatible such as an O mother and an A baby any fetal red cell (Group A) entering the maternal circulation (Group O) is destroyed, in an exactly similar way to that occurring in an ABO incompatible blood transfusion.

-PREGNANCY:

FMH does occur during pregnancy but is much less common than following delivery. Most of the bleeds occur in the last trimester when the placenta is degenerating and the barrier may become a little more pervious.

-The prevention of RHD:

D-positive FMH's can be neutralized by passively administered anti-D antibody (Rh immunoglobulin) " in every pregnancy ".

- At 28 weeks
- Post delivery
- After abortion
- APH / trauma
- External version
- Amniocentesis

-FAILURE RATE:

About 1% of Rh-ve women become immunized after D-positive pregnancies despite treatment with Rh immunoglobulin

Those already primed, even though overt antibody is undetectable by present techniques.

Large FMH's before delivery e.g. epileptic or eclamptic patients.

Extreme sensitivity to the D-antigen: thus small bleeds will produce primary response.

Large FMHs after delivery more than the amount that can be taken care of by standard dose of immunoglobulin.

Failure to give the immunoglobulin – patients who slip through the net.

-MANAGEMENT OF ISOIMMUNIZATION:

Pregnancies complicated by clinically relevant isoimmunization are managed in centers with fetal medicine units and regional blood transfusion.

- 1-Maternal blood group and antibody quantification
- 2-Paternal blood group genotyping
- 3-Fetal blood group genotyping
- 4-Ultrasound assessment
- 5-Amniotic fluid spectrophotometry
- 6-Fetal blood sampling
- 7-Fetal blood transfusion

-MGT:

Maternal blood group and antibody quantification at booking and 28 weeks if initial is –ve

Paternal blood group genotyping

Anti-D titer is not serous if below 1:16 and should be repeated every 2-4 weeks

If titer is above 1:16 invasive testing:

- Ultrasound assessment
- Amniotic fluid spectrophotometry
- Fetal blood sampling
- Fetal blood transfusion

-ULTRASOUND ASSESSMENT:

The severely anemic fetus on scan will have: skin edema, ascites, pleural or pericardial effusions, cardiomegaly and an edematous placenta (Hydrops).

Middle cerebral artery blood flow is increased



-AMNIOCENTESIS AND AMNIOTIC FLUID ANALYSIS:

When fetal hemolysis occurs the amniotic fluid becomes bright yellow from the bilirubin

Amniotic fluid bilirubin concentration can be quantified by spectrophotometry by assessing the change in optical density at 450nm ($\Delta OD 450$)

Amniocentesis is started after 24 weeks under ultrasound guidance

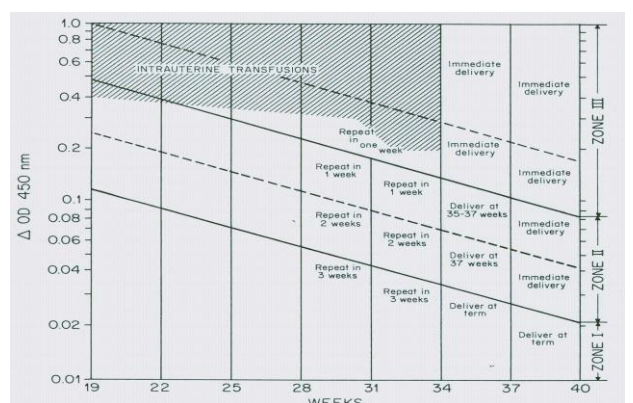


Figure 30-2. Modified Liley chart used to determine the appropriate management of the patient with isoimmunization.

-COMPLICATIONS FOLLOWING INTRAUTERINE TRANSFUSION:

- 1- Premature labour
- 2- Pre-labour ruptured membrane
- 3- Fetal haemorrhage
- 4- Fetal bradycardia
- 5- Failure to obtain a sample
- 6- Increase in maternal Iso immunization by inducing feto-maternal haemorrhage

-CTG:

Fetal heart rate changes have been noted with severe anemia. A sinusoidal pattern with the loss of normal baseline variability of the CTG is highly suggestive of severe anaemia

-Irregular Antibodies:

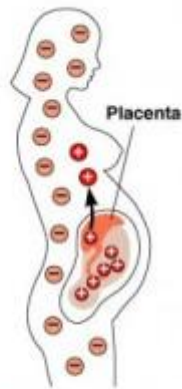
2% other than Rh D

Kell, Duffy, Kidd....ext

In summary



1 Rh⁺ father.



2 Rh⁻ mother carrying her first Rh⁺ fetus. Rh antigens from the developing fetus can enter the mother's blood during delivery.



3 In response to the fetal Rh antigens, the mother will produce anti-Rh antibodies.



4 If the woman becomes pregnant with another Rh⁺ fetus, her anti-Rh antibodies will cross the placenta and damage fetal red blood cells.